External Sex Characteristics of Cryptotermes brevis (Walker) and Kalotermes immigrans Snyder (Isoptera: Kalotermitidae)

ELIZABETH A. MCMAHAN

DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY
UNIVERSITY OF HAWAII
HONOLULU, HAWAII

(*Submitted for publication November, 1959*)

The external characteristics used in distinguishing sex in termites concern primarily the terminal three or four abdominal sterna and their appendages. The presence or apparent absence of these structures, however, and their variations depend upon the species involved. Imms (1920) has described in detail the external sex morphology of *Archotermopsis wroughtoni* Desneux for all castes, and Sumner (1933) has studied similarly *Zootermopsis angusticollis* Hagen. Their descriptions form the basis for this brief discussion of means of sex identification in *Cryptotermes brevis* (Walker) and *Kalotermes immigrans* Snyder.

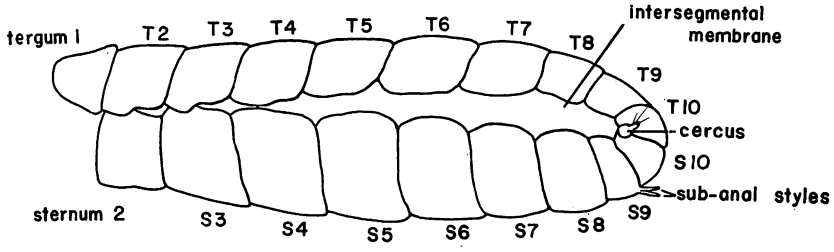
A typical termite has ten abdominal terga and nine sterna (the first sternum is atrophied). Sub-anal styles are often present on the posterior margin of the ninth sternum, and anal cerci are always present, arising from beneath the tenth tergum. Figure 1, A is a lateral view of the abdomen of a *Cryptotermes* male primary reproductive, showing the typical arrangement of terga, sterna, sub-anal styles, and cerci.

Reproductives. In *C. brevis* the primary reproductives show morphologically the same general characteristics that Imms and Sumner describe for *Archotermopsis* and *Zootermopsis* respectively, and the sexes are easily distinguished. Sterna 2–9 are simple plates in the male, and sternum 10 is divided into two podical or sub-anal plates. Sub-anal styles are present. The female appears to possess a total of only seven sterna because the eighth and ninth are hidden by the much-enlarged seventh. The tenth is divided as in the male. Sub-anal styles are not present. Figure 1, B and C are ventral views of the abdominal apices of the male and female primary reproductives.

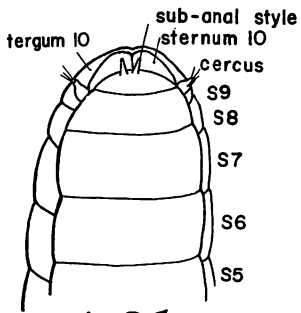
Supplementary reproductives have these same distinguishing characteristics, as have also the penultimate instars.

Soldiers. The easiest means of distinguishing male from female soldiers in *C. brevis* is by noting the presence or absence of sub-anal styles. Males have them; females do not.

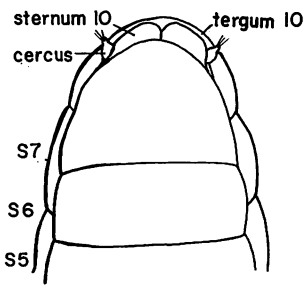
Imms quotes Holmgren to the effect that external manifestation of sex in termite soldiers is to be found only for those of *Mastotermes* (Mastotermitidae).



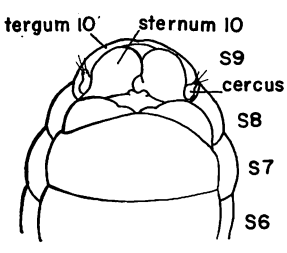
a. R♂



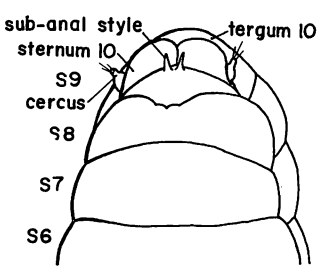
b. R♂



c. R♀



d. S♀



e. N♀

FIG. 1. A, Lateral aspect of abdomen of *Cryptotermes brevis* male primary reproductive; B, C, D, E, ventral aspects of apices of abdomens of *C. brevis* male primary reproductive, female primary reproductive, female soldier, and female nymph, respectively.

Imms points out, however, that *Archotermopsis* (Hodotermitidae) and certain genera of the Kalotermitidae similarly exhibit it. Müller (1873), for example, showed that female soldiers of two *Kalotermes* species are distinguishable from male soldiers by the shape of sternum 8, females having the posterior margin indented. *C. brevis* female soldiers may be similarly distinguished, the eighth sternum appearing as two lateral plates posterior to, and partially covered by, sternum 7 (fig. 1, D). The characteristic notching of the eighth sternum in the female will be mentioned again in connection with the nymphs.

Nymphs. Up to this point sex in *C. brevis* has been shown to be distinguishable on the basis of the presence or absence of sub-anal styles. In the case of the nymphs, however, this is not a basis for differentiation. Both male and female nymphs, with the exception of penultimate females, possess them. The differences come in the posterior marginal contour of sternum 8. In female nymphs (fig. 1, E) the eighth sternum is posteriorly notched to a greater or a lesser degree depending upon the instar, and with every molt becomes more and more overgrown by an enlarging sternum 7, under which it can be telescoped. Older females have only a lobe of the eighth visible on each side, similar to the female soldier. In male nymphs the eighth sternum is simple and straight along the posterior margin, just as in the case of male primaries and male soldiers.

Kalotermes immigrans Snyder

The sexually distinguishing characteristics discussed for *C. brevis* will also differentiate between the sexes for *K. immigrans*, except that in the soldier, as in the nymph, sub-anal styles are present in both sexes. In this case the notching of the eighth sternum, its partial concealment by the seventh, and the broad nature of the latter identifies the female.

References

Imms, A. D. 1920. On the structure and biology of *Archotermopsis*, together with descriptions of new species of intestinal protozoa, and general observations on the Isoptera. Phil. Trans. Roy. Soc. London, B, 209:75–180.

Müller, F. 1873. Beiträge zur Kenntnis der Termiten. I. Die Geschlechtsteile der Soldaten von *Calotermes*. Jena Zeits. f. Naturw .7:332–340.

Sumner, E. C. 1933. The species of the termite genus *Zootermopsis* Emerson (=*Termopsis* Hagen). Univ. Calif. Publ. Ent. 6(7):197–230.